

terstitial splenitis and hemosiderosis; passive congestion of the liver; chronic parenchymatous nephritis; hydronephrosis and hydrometer; chronic interstitial pancreatitis.

## THE RELATION OF LOCALIZED TENDERNESS TO THE SITE OF THE CAUSAL LESION IN PERFORATIVE PERITONITIS.\*

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In keeping with this symposium the bearings of this paper will center on perforation is gastroduodenal disease. Four cases of perforation of ulcer of these parts coming within the writer's personal experience form the clinical basis of this paper.

The time limit will permit neither the consideration of the relations of the symptom under special view to the larger symptomatology of perforation, nor to the differential diagnosis.

The weight of present-day judgment seems to be that within several hours from the time of perforation there is usually a widespread, diffuse abdominal tenderness, and in addition "careful search will reveal an area of exquisite intensity overlying the ulcer."<sup>1</sup> Other localized areas of special tenderness with a single exception, are not dwelt upon, as one of the generally recognized occasionally associated features of the condition.

A number of authorities dwell upon the fact that with perforation in certain cases of duodenal ulcer, the main symptoms may become localized in the cecal region, and have often led to operation for appendicitis, instead of a first, direct surgical attack upon the upper digestive tract. The real source of these symptoms has even been overlooked after this misapplied surgery. Moynihan, as early as 1901, found 49 recorded cases of perforated duodenal ulcer resembling appendicitis, in 18 cases of which the first abdominal incision had been made over the appendix. His explanation is that the foreign fluid following the right-sided para-colic peritoneal planes, reaches the *caput coli* and causes there the local serous irritation which results in so much symptomatic confusion and surgical error. Even within the first three hours following perforation, greater abdominal resistance and more marked, even exquisite, tenderness may exist at the usual site of the appendix.

It may be that this was the exceptional condition Munro had in mind, when speaking broadly of peritonitis but without detailed reference or attempted explanation, stated that "the tenderness and spasm, with few exceptions, are located over the area of more marked infection."<sup>2</sup> Ordinarily, however, in perforation of both gastric and duodenal ulcers, the extruded fluid runs at large in the peritoneal cavity, in an indefinite way, producing diffuse peritonitis.

In view of what clinical experience has established in regard to local symptoms developing in

the right iliac region, does it seem unreasonable that similarly localized symptoms of irritation should arise in the presence of an advancing peritonitis in other portions of the abdomen as well? It has not, however, thus far come to the writer in his search, that except as already noted, other associated areas of special irritation are generally recognized. That, however, restricted irritative symptoms at a distance from the ulcer, amongst which localized tenderness must be one, are often enough met with but wrongly interpreted prior to the operation, is strongly suggested by the surgical errors reported in connection with operations in the course of peritonitis from gastroduodenal disease. Often enough, the operator's efforts for a short search and a quick operation are hampered by a misinterpretation of symptoms and a consequent disadvantageously placed abdominal incision. Yet in the long run, the amount of manipulation of the viscera, the operative trauma, the time consumed in operation affect decidedly the mortality rate.

The findings of the writer are at variance in some respects with what seems to be the generally accepted relationship of localized tenderness in this disease. The apparently controverting testimony noted in his cases, if admitted, may, therefore, be regarded as exceptional.

A possible source of difference between observers as to conclusions regarding sensitive areas might result from different degrees of palpatory pressure. The method of abdominal palpation followed by the writer was not a deep but a moderate, reasonable pressure such as the condition of the patient would warrant, and the superficial location and the sensitiveness of the parts require. If, however, the results of deep and moderate pressure are at variance, it would be well to have the difference established.

As the result of his personal observations the writer is disposed toward the following conclusions bearing upon the relation of localized tenderness to the site of the causal lesion.

1. The site of the perforated ulcer, as indicated by moderate abdominal palpation within several hours after the onset, is not uniformly *intensely* sensitive.

2. Neither is it always the most sensitive area.

3. In addition to the well recognized local symptoms referable to the region of the perforated ulcer and the appendix, other parts of the abdominal viscera may, exceptionally, be the seat of confusing sensitiveness.

Case 1. D., male, age 50, first seen over twenty-four hours after perforation, refused operation and perished. Autopsy showed diffuse septic peritonitis and perforated duodenal ulcer.

Case 2. P., male, age 35, first seen two hours after perforation, presented only classical symptoms of most intense degree; no diagnostic or operative difficulties. Operation showed perforation of gastric ulcer on the anterior surface to the right of the median lines, close to the greater curvature. Prompt recovery ensued.

Case 3. M., male, age 42 years, was first seen six hours after perforation. The entire abdomen was rigid and retracted. The pyloric region was not specially tender. There was, however, a per-

1. Deaver, John B.: Acute Perforated Duodenal and Gastric Ulcers. *Annals of Surgery*, May, 1913, p. 705.

2. Keen's Surgery, Vol. III, p. 771 (J. C. Munro).

\* Read at the Forty-fourth Annual Meeting of the Medical Society, State of California, Santa Barbara, April, 1914.

sistent area of marked epigastric sensitiveness the size of an egg to the left of the median line, to the outer side of the left rectus. Its relation to the area of greatest muscular rigidity was not noted. Operation advised. It was three hours later before he could decide on his course, he gotten to the hospital and prepared for operation. Grumous material and inflammatory exudate covered the gastric and colonic surfaces beneath the area of special tenderness, but it was not specially restricted to that locality. Recent adhesions were present between stomach and abdominal wall. All parts exposed showed an intensely inflamed peritoneum; that portion beneath the seat of marked sensitiveness not as pronounced as that more adjacent to the location of the ulcer. **The perforation was found, not at the left beneath the most tender area, but on the opposite side** close to the pylorus near the lesser curvature. Recovery ensued.

Case 4. C., male, age 51 years, was first seen nine hours after perforation. He had been originally taken to a hospital in a neighboring city, where diagnosis was not made, but a hypodermic of morphine administered. Neither water nor whisky swallowed after onset caused gastric distress. His previous history as to ulcer was not convincing. He was without fever and in good general condition. He did not seem seriously ill, nor was he apparently much distressed. His abdomen was only moderately contracted. **The left side was decidedly the more rigid.** There was only a mild, diffuse, epigastric tenderness. There was, however, an area of marked sensitiveness, sharply localized beneath the left rectus about 5 cm. below the level of the umbilicus, beneath the most rigid portion of the abdominal parietes. Colonic irrigation was without result. The water returned with an apparent slight bloody tinge with sanguino-mucous flakes. Diagnosis was in doubt. The aggregate of symptoms and physical findings seemed to indicate a lower intestinal, rather than a gastric or duodenal lesion. Operation three hours later. Incision was made in the midline below the umbilicus. Everywhere was present the evidence of pronounced, diffuse, septic peritonitis. Beneath the area of special tenderness, there was a small, rather localized collection of sero-purulent and flaky exudate. The cecal and left transverse colonic regions, where special symptoms of irritation were not noticeable before operation, showed, however, the same condition. This incision was closed except at its lowermost portion where a pelvic drain was placed. The epigastrium was then opened and **perforation was found distant from and on the side opposite to the site of greatest sensitiveness**, close to the pylorus, at the lesser curvature. Recovery ensued.

Can these findings be reconciled with the generally recognized symptomatology and with the numerous apparently contradictory operative observations? The following is offered as a possible solution:

The portion of peritoneum at the site of perforation, in certain instances, being subjected to continuous, prolonged irritation from an unusually concentrated and irritating extruded gastric contents, to which the tissues of some individuals may react differently than those of others, may after a time, lose something of its sensitiveness and fail to respond to increased stimulation by palpation. This condition would only be analogous to the well recognized depression of nerve function, even paralysis, resulting from overstimulation in other parts of the body of motor, and special sense nerves. Or as a result of local toxic and inflammatory influences, actual changes may take place in the delicate peritoneal nerve

terminals that prevent the conduction of pain impulses.<sup>3</sup> Coincidentally, other areas coming within the zone of spreading irritation, either for some reason naturally more sensitive or having been subjected to a less overpowering degree of irritation, by reason of their distance from the ulcer, may at this later period and at least temporarily, be relatively more keenly alive to pressure than is the original focus from which the irritation has come. That the greatest abdominal wall protective rigidity should then be over these now more sensitive parts does not seem to be strange or unreasonable; or that, as these new peritoneal areas are involved, symptoms referable to the newly affected part may stand out, at least for a time, with conspicuous boldness and attract and unduly hold the surgeon's attention.

At times the approximate site of perforation is susceptible of fairly close determination. But again, with an incomplete antecedent and recent history, a knowledge of which the sufferings of the patient or the ignorance or nervousness of his associates prevent the surgeon from gaining; with an atypical symptomatology; with other symptoms resulting from almost necessary complications of the primary disease pressing to the front and obscuring the original state; with the usual signs of morbidity dissipated or altered by injudicious narcotic medication, the clinical picture may be so changed, that the diagnostic skill of the well informed surgeon may be overtaxed.

This much, at least, is demanded in the presence of general peritonitis: If the local tenderness and other signs seem to indicate that the appendix is involved, before its surgical approach, the duodenum should be questioned and first given clearance. If localized tenderness exists in other abdominal areas, no matter how low down, the stomach and duodenum, both, should be considered as possible original sources of trouble, and passed upon. After the lapse of several hours from the time of perforation, local abdominal tenderness must be cautiously judged and discriminately received, if at all, as a directing symptom. The possible falsifying peritoneal tendency as to localized tenderness demands its accurate collation with all other symptoms of the condition in question together with a consideration of the stage of the disease and the available history.

### THE BUTYRIC ACID TEST OF NOGUCHI AS AN AID IN DIAGNOSIS.\*

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The cerebro-spinal fluid is the liquid which bathes the brain and spinal cord, acting, first, as a hydraulic cushion to protect against jars; second, as a medium to carry away waste products; and third,

3. Prof. Maxwell, of the Department of Physiology, University of California, informs the writer that the possibility of paralysis from overstimulation is positively determined in sensory nerves. As to the conduction of pain impulses, the matter has not, so far as he is aware, been actually worked out; he regards it, however, not improbable. He advanced the suggestion of the possible depression of the function of pain conduction from toxic effects on the nerve terminals, as a probable added factor in this special condition.

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